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EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE DELMARVA PENINSULA IN MARYLAND AND VIRGINIA

U.S. Forest Service
Asheville, North Carolina

U. S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
SOUTHEASTERN AND NORTHEASTERN AREAS
STATE AND PRIVATE FORESTRY
DIVISION OF FOREST PEST CONTROL

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EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE DELMARVA PENINSULA IN MARYLAND AND VIRGINIA

By

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ABSTRACT

The southern pine beetle, *Dendroctonus frontalis* Zimm., is causing heavy timber mortality on the Delmarva Peninsula in Maryland and Virginia. Epidemic populations are currently located in Worchester County, Maryland (306,560 acres) and the northern portion of Accomack County, Virginia (84,480 acres). In Worchester County there are 7.8 ± 2.9 spots and 218.8 ± 127.3 infested trees per M acres of host type. In Accomack County there are 10.8 ± 4.7 spots and 119.7 ± 61.9 infested trees per M acres of host type. Host trees are merchantable loblolly pine, *Pinus taeda* L.. The survey covered 1,604,480 acres on the Delmarva Peninsula, the southernmost six counties in Maryland and the northern portion of Accomack County in Virginia.

INTRODUCTION

The southern pine beetle, *Dendroctonus frontalis* Zimm., has been a periodic problem in pine stands on the Delmarva Peninsula of Delaware, Maryland and Virginia for a number of years. In Maryland, State Forest personnel observed increased timber mortality from the beetles activity in 1964 and 1965. Salvage operations during this period helped check the the infestations. Increased beetle activity was noticed again in 1969 and in 1970 when it was serious enough to cause alarm among the land managers.

Prompted by this concern, an aerial sketch map survey was conducted on the Delmarva Peninsula of Maryland by State and Forest Pest Control personnel to assess the seriousness of reported damage by the southern pine beetle. This 10 percent survey of four counties placed losses due to the beetle at 12.3 trees per thousand acres of host type (1).

Subsequent to the August survey, unusually dry conditions and warm temperatures which are favorable to beetle build-up continued through October. Reports of increased beetle activity during these months from State personnel in Maryland and Virginia indicated another survey and appraisal was warranted.

In December and January (1970-1971) Forest Pest Control personnel from the Southeastern and Northeastern Areas cooperatively conducted an aerial photographic survey of one Virginia and six Maryland Counties (Fig. 1).

The results of photographic interpretation, ground checking and radiographic bark sampling are presented to aid both States in control and salvage decisions. Participants in the survey were J.L. Rauschenberger, P.J. Barry, W.H. Clerke, E.T. Wilson, Southeastern Area; J.B. Hanson, M. Reed, Northeastern Area; C.L. Haine, Region 8; and W. P. Merrill and D. Handgardner, Region 9.

METHODS

Aerial photographs were taken of 273 sample plot locations within the survey area which included the counties of Talbot, Caroline, Dorchester, Wicomico, Somerset, and Worchester in Maryland and a portion of Accomack County in Virginia (Fig. 1). Sample plots were located at 2.8 mile intervals along flight lines running approximately north and south. The distance between the flight lines was approximately 2.7 miles. Sample plots covered 3.3 percent of the survey area.

Sample plots were photographed with 12-inch focal length lens aerial cameras using Kodak Infrared Aerial Color Film Types 8443 and SO-117 with appropriate filters. Color infrared films penetrate haze, provide good differeniation between hardwood and pine type, and accentuate the color of dying pine trees.

The photographs of the survey area, with the exception of Worchester and a portion of Accomack County, were taken on November 30 and December 1-2, 1970. The remainder of the survey area was photographed on January 4-5, 1971. Marginal conditions for aerial photography prevailed during the November and December flights; many hardwoods retained dead foliage (producing photo images similar to dying pines), and weather conditions were poor. Conditions had greatly improved for the January flight when Worchester County, Maryland and southern remaining plots in Accomack County in Virginia were photographed.

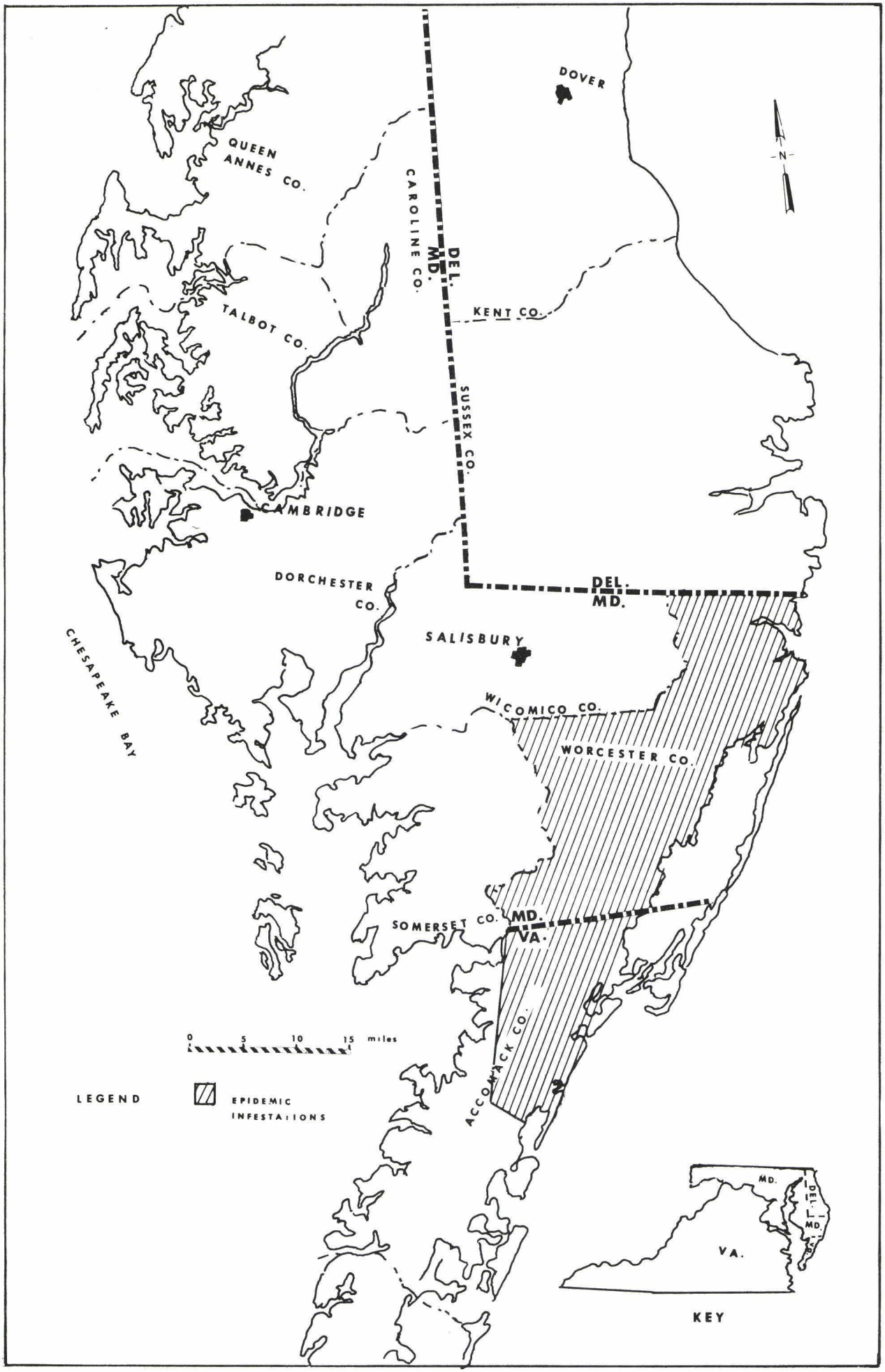

FIG. I AERIAL SURVEY OF DELMARVA PENINSULA

The film was processed by the Southeastern Area, Division of Forest Pest Control and Data Corporation, Dayton, Ohio. The photography was interpreted by the Southeastern Area, Division of Forest Pest Control. Interpretation of photographs consisted of marking the boundaries of the 200-acre plot in the center of the overlap area of each stereo pair of photographs. A photo interpreter used an Old Delft Scanning Stereoscope to examine the photographs. The interpreter recorded the number of beetle spots and the number of dying pine trees for each photo plot. Host type for each plot was estimated using a block grid; each block represented two acres. Any block containing 25 percent or more pine was classified as host type.

Ground checks based on photo-interpretation results were made in Worchester County, Maryland and Accomack County, Virginia. Thirteen spots in Worchester County and ten spots in Accomack County appearing on the photographs were ground checked. The number of trees in each crown color cateagory and the number of currently infested trees were determined for each spot ground-checked. Bark samples were collected from infested trees for laboratory determination of brood density. Bark samples were radiographed and the brood density determined at Forest Pest Control Laboratories at Asheville, North Carolina and Delaware, Ohio. Data from aerial and ground surveys of Worchester County, Maryland and Accomack County, Virginia was analyzed according to methods developed by the Division of Forest Pest Control (2) using the Divisions time sharing computer terminal.

RESULTS

Analyses of data from the aerial portion of the survey indicated that epidemic southern pine beetle populations within the survey area, were concentrated in Worchester County, Maryland and Accomack County, Virginia. Observations during the aerial phase of the evaluation bear out the results of the photo-interpretation.

Survey results are summarized in Table 1. Twenty-eight spots were detected on the aerial photo plots in Worchester County and ten spots in Accomack County. Spots of red and fading trees detectable on the photographs ranged in size from 1-50 trees. The number of infested trees in ground-checked spots ranged from 1 to 174 in Worchester County and 3 to 38 trees in Accomack County. Because of the relatively small number of spots ground-checked a single large spot such as the 174-tree spot in Worchester County, may inflate estimates of infested trees per M acres of host type. Except for one 12-tree spot, all the spots ground-checked appeared on the aerial photographs.

Brood density in the bark samples radiographed was high (Fig 2): 388 $\pm$ 30 insects per square foot of bark surface in Worchester County and 359 $\pm$ 36 in Accomack County. Larvae of the clerid beetle, *Thanasimus dubius* (F.), a predator of southern pine beetle were occasionally encountered in the bark samples. Woodpeckers have removed as much as 50 percent of the infested bark from individual trees. Their activity is scattered and probably not a significant factor in reducing beetle populations at this time.

Table 1. Summary of Results of Biological Evaluation of Southern Pine Beetle Infestations on the Delmarva Peninsula, January 1971.[1]

Survey Unit	Total Acreage	Estimated acreage in Type	Percent Survey	Number of spots per M acre Host Type	Number of red and faders per M acre Host Type	Number of infested trees per M acre Host Type	Estimated total number of spots.	Estimated total number of red and fading trees.	Estimated total number infested trees	Average brood density	Potential for future loss
Worchester County, Maryland	306,560	107,296	3.3	7.8 ± 2.9	73.3 ± 26.8	[3] 218.8 ± 127.3	837	7,865	23,476	388 ± 30	High
[2] Portion of Accomack County, Virginia	84,480	23,654	3.7	10.8 ± 4.7	101.4 ± 53.6	119.7 ± 61.9	255	2,398	2,831	359 ± 36	High

1/ 68 percent confidence limits.
2/ Survey area included 28% of the county.
3/ See Discussion.

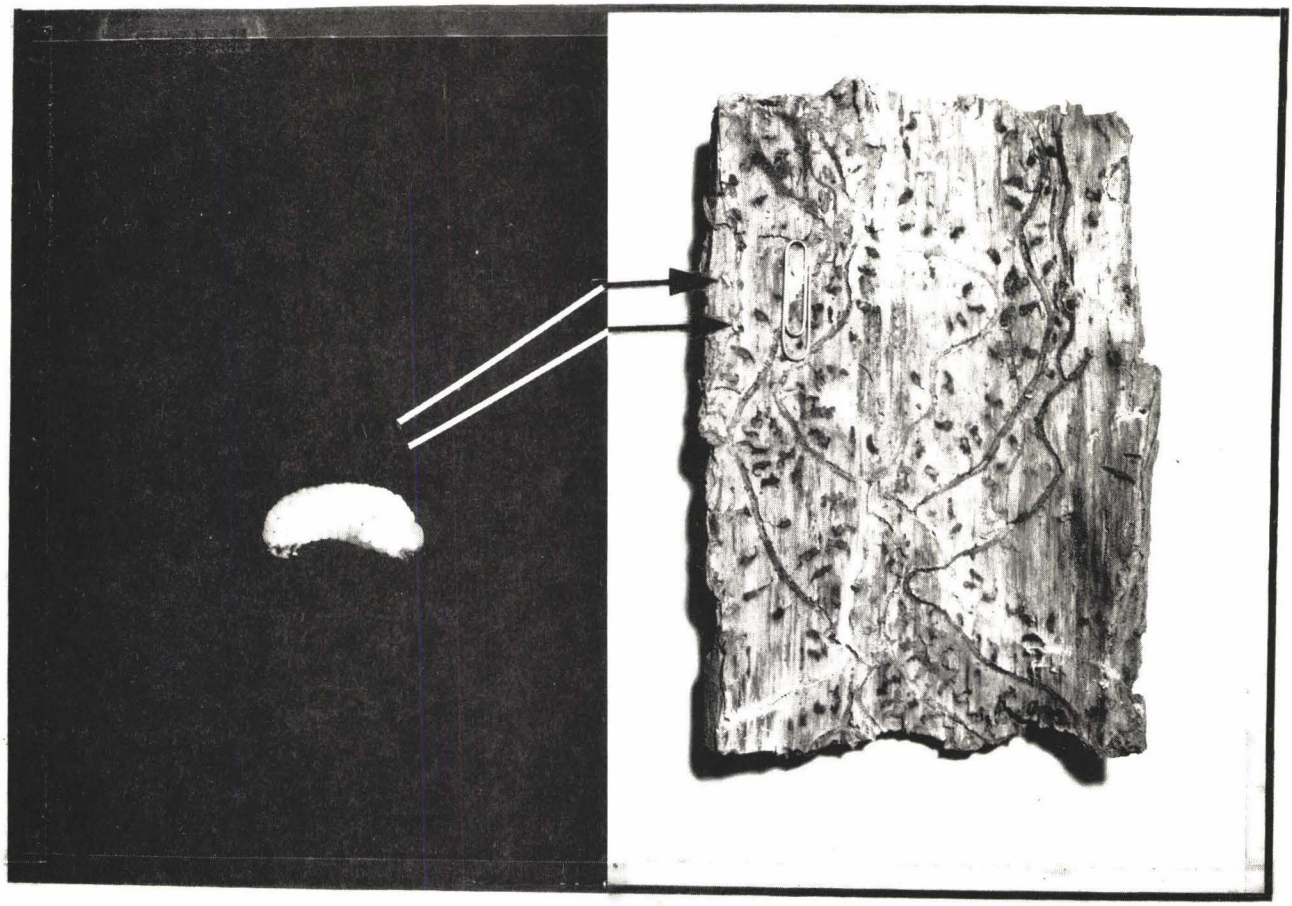

Fig. 2. Bark sample showing galleries and larvae of southern pine beetles.

DISCUSSION

Survey results indicate that high population levels of the southern pine beetle, *Dendroctonus frontalis* Zimm., are causing considerable tree mortality in Worchester and Accomack Counties. High brood density and low predator activity indicate that high levels of tree mortality are likely to continue during the spring and summer of 1971.

The infestations are occurring primarily in even-aged merchantable stands of loblolly pine, *Pinus taeda* (L.) on old field sites. Ground examinations indicate that many of the spots, while not large, have been active for several years, causing considerable economic loss to landowners. Because of the flat topography of the area a casual observer may not realize the extent of infestations.

CONCLUSIONS

The winter months are the most opportune time to cope with a potential southern pine beetle infestation. Populations are generally stable and individual spots remain relatively constant in size and intensity of attack. It is a time when salvage control operations can "catch-up" with the infestation.

Where resource criteria and values deem control and/or salvage necessary, the following action is suggested. Guidelines for specific action appear in FSM 5250.

1. In all areas where resource values warrant, an intensified salvage effort should be conducted for the duration of the winter months.

2. In inaccessible areas where inherent or surrounding resource values deem control necessary, an intensive program of cutting, piling and burning of infested trees should be conducted.

REFERENCES

1. U.S. Forest Service. Northeastern Area, State and Private Forestry, Division of Forest Pest Control. 1970. Survey of southern pine beetle damage, Delmarva Peninsula, Maryland. Rpt. No. D-7-70.

2. U.S. Forest Service, Southeastern Area, State and Private Forestry, Division of Forest Pest Control. 1970. Evaluating southern pine beetle infestations. Southeastern Area Publication No. 8.

More detailed information can be obtained by writing to the Forest Pest Control Division Field Offices listed below or to the Altanta Office.

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